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TRAFFIC ACCIDENT RESEARCH UNIT



DRINKING AND DRIVING: SOCIOLOGICAL ASPECTS

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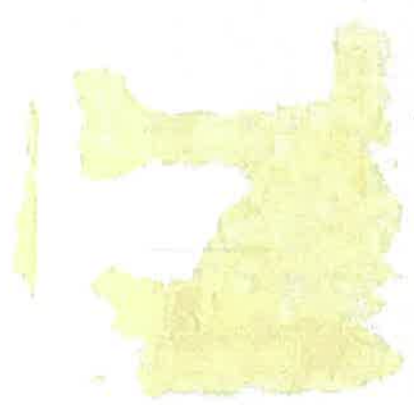
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The Traffic Accident Research Unit was established within the Department of Motor Transport, New South Wales, in May 1969 to provide a scientific approach to the traffic accident problem.

This paper is one of a number which report the results of research work undertaken by the Unit's team of medical, statistical, engineering and other scientists and is published for the information of all those interested in the prevention of traffic accidents and the amelioration of their effects.

D. H. Coleman

Commissioner.



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Introduction

In providing the means for mobility for countless thousands of people in this highly urbanised and affluent society, the highway system must perforce cater for many individuals whose quality of performance is relatively low. This may be temporary or permanent, and precipitating factors can include inborne incompetence, age, illness, and, most importantly of all, the ingestion of alcohol.

Because alcoholic intoxication has emerged as the prime "human" factor in increasing the risk of a traffic crash, the combination of drinking and driving has not only become the subject of intense and careful study over recent years but has also precipitated in most motorized countries the introduction of a variety of legislative controls with the basic objective of reducing crash rates. But drinking and driving are both such widely practised customs, with such firmly entrenched patterns of behaviour, that their adequate study and the design of measures to control their interaction is fundamentally dependent on a proper understanding of the social, economic and cultural backgrounds from which the relevant behaviour patterns have arisen. In this paper, what is known about drinking patterns in Australia is reviewed, as are some studies of drink-driving offences and crashes in which account has been taken of socio-cultural influences and previous drinking habits. A very great deal of information still needs to be gathered, however, and some preliminary data from a N.S.W. study of drink-driving practices and attitudes are reported.

The Relevance of Custom

The vast majority of drivers drink and the vast majority of drinkers drive. Indeed, it could be maintained that one of the functions of the highway system is to facilitate the movement of drivers who have been drinking: housewives returning from sherry parties, businessmen from working lunches, golfers and bowlers from clubhouses, teenagers from parties, working men from pubs, diners from restaurants and the homes of friends. One of the purposes for which private motoring exists is the furtherance of social occasions, and it is rare today for a social gathering not to rely in part for its success on the easy availability of alcoholic beverages. Well over 300 million gallons of beer are drunk in Australia annually, plus 22 million gallons of wine and over 4 million proof gallons of spirits.²⁰ This represents the alcohol in about two 7oz glasses of beer per day for every adult and child in the Commonwealth. Much of this alcohol will have been urged upon guests by hosts who would have been considered pretty poor specimens if they had acted otherwise. A staggering number of miles are annually driven, therefore, under the deleterious influence of alcohol.

Fortunately, most of these miles are travelled without disastrous consequences, and most drivers correctly perceive that their chance of crashing on a given five-mile trip, drunk or sober, is extremely low. This obscures the relationship of drinking to driving for the casual observer.

There is only a weak natural process of inhibition, therefore, operating to restrict the interaction of these two pervasive customs, drinking and driving cars.

Accordingly, attempts are being made all over the world to minimise the incidence of the mixture by behavioral controls which are, at present, predominantly educational and legislative in nature.

People's behaviour, however, is not only governed by legal controls and educational efforts, but also - and predominantly, according to workers such as Carlson and Klein⁶ - by different social, economic and cultural backgrounds as well as by pressures generated by peer groups and life styles. In the present case, these pressures will be manifest in differing attitudes and habits relating to drinking, driving, and the mixture of the two.

The social scientist is not solely concerned with the drinking driver after he has crashed or violated traffic laws, but with the customary behaviour of all those who drink, all those who drive, and all those who do both together. There are vast differences in the degree of increase in crash risk arising from different drinking-driving practices and, if continued attempts to add to the safety of the road transport system through institutional controls are to remain rational and as effective as resources allow, then measures designed to cut the number of drink-related crashes must be planned with these

differences properly categorized and clearly in mind.

Traffic safety will gain little from attempts to change the behaviour of groups of drinking drivers whose crash risk is already low, but the rewards to be sought in a more selective approach are potentially high.

Regrettably, however, we are as yet far from being able to categorize Australian drinking and driving customs in such a way that various types of interaction can be related to traffic crash risk. A number of studies with important sociological implications have been undertaken in the United States, and some of these are listed in the references. ^{1,4,5,7,8,11,14} But the central point at issue is that customs and traditions arising from and perpetuated by sociocultural influences may differ very markedly between nations, and it is not possible to assume that the results of research in this field in other countries will necessarily be valid for Australia. Nevertheless, there are some local data available. Studies in this country^{2,3} have demonstrated, as in other nations, that drinking drivers involved in collisions are commonly very drunk, to an extent which would be considered unacceptable to the majority of citizens, and that in other respects the behaviour of many of these drivers has previously been generally antisocial.¹² There have, too, been some studies of community drinking patterns, work which has however usually been conducted by researchers interested in alcoholism, another public health problem thrown up by alcohol misuse.

These studies can provide considerable insight into the drinking habits of a population largely dependent upon automobile usage.

Drinking habits in Australia

A community survey of drinking practices and attitudes was conducted in the Sydney metropolitan area during 1968-69 among a random sample of 832 persons representative of the population aged 15 years and over, and some preliminary results have been reported by Encel and Kotowicz.⁹ These authors noted that their study reflected a growing trend in research on drinking and its relation to alcoholism and was, essentially, an attempt to increase understanding of drinking abnormalities by focussing on heavy drinking as a social phenomenon, as distinct from alcoholism as a clinical phenomenon. They concluded that there is widespread "heavy" drinking in the general Sydney population and that total abstention is far less common than in America. Of the 374 males in the sample, 48% were defined as heavy drinkers and 8% as abstainers (those who drank none of the alcoholic beverages as often as once a year). Of the 448 females, 15% were heavy drinkers and 18% abstained.

They found that drinking patterns were clearly related to sex: heavy drinking was by no means randomly distributed in the population but was concentrated among males. For Sydney men, heavy drinking was found to be normative behaviour and light infrequent drinking rare. For women the reverse applied, although drinking norms were by no

means so clear cut.

Age was found to have little effect on drinking patterns for men, but a marked effect for women. No reduction in heavy drinking with age was found for males, for whom heavy drinking was apparently the norm for every age group over 20 years. (There was some evidence that, beyond 60 years, age becomes slightly more important in determining a man's drinking pattern, insofar as light, infrequent drinking and abstention are more prevalent in this older age group.)

For women, on the other hand, Encel and Kotowicz found that the prevalence of heavy drinking tends to increase with age between 20 and 60 years, after which it diminishes considerably. In fact, heavy drinkers and light infrequent drinkers appear to be equally prevalent among women aged between 40 and 60 years. For women aged 60 years and over, abstention become the most frequent pattern defined.

The general findings with regard to age, sex and drinking patterns were that while female drinking habits are clearly related to such sociocultural variables as age, education, occupation and income, for virtually every population subgroup heavy drinking is the characteristic pattern for males. These authors concluded that heavy drinking for men is socially acceptable and even encouraged.

A criticism which has been levelled at this study is that for the purpose of comparison the researchers used a classification which had been used previously for a study of drinking practices in California. Those classed as "heavy"

drinkers were (a) those who drank at least two or three times a month, with a modal quantity of five or more drinks at each sitting; (b) those who drank at least three or four times a week, with any modal quantity and a range of five or more drinks; (c) those who drank nearly every day or more often, with any modal quantity and a range of three or more drinks. The use of the word "heavy" in this context is in some ways unfortunate, as it carries subjective overtones of non-acceptability versus acceptability, or bad versus good, whether the authors intended this or not. In the drinking and driving context, it would be possible for many "heavy" drinkers as thus defined never to achieve a level of blood alcohol in excess of the New South Wales legal limit of .08gm% or even the Victorian limit of .05gm%, let alone the sort of level (typically around .16gm% and often very much more) found in the blood of drivers involved in car crashes. The authors are aware of this, and point out that similar studies in the future should include measurements of duration of each drinking session in order that the categories concerned may be more adequately defined.

In a recent study of a Melbourne suburban community, Rankin and Wilkinson¹⁶ found that of a sample of 742 men aged 20 years and over, 79.8% drank alcoholic beverages, and the average daily consumption most commonly recorded was between 11 and 40 grammes of ethanol per day (10 grammes of ethanol is equivalent to a 7oz glass of beer). The pattern for females was of lighter drinking overall.

The adult male drinking pattern was firmly established by the third decade, and, as also found for the Sydney sample, the proportion of light (1 - 10 grammes of ethanol per day), moderate (11 - 40), moderately heavy (41 - 80), and heavy (81+) drinkers remained fairly constant. Again as found in Sydney, a larger proportion of heavy drinkers in the female sample appeared in the fourth decade of life.

Both abstinence and heavy drinking were commoner among the lower social strata of men and women, among native-born Australians, and among British, North-West and Central European and Greek migrants. Polish, Eastern European and Italian migrants drank more moderately, but fewer were abstainers.

By the age of 30 years, most drinkers consumed alcohol on four or more days a week, and the amounts drunk each day were comparable. Below 30, about half the drinkers drank only at weekends, and Rankin and Wilkinson note that because of the method of estimating intake as an average daily amount, some heavy drinking, restricted to weekends, was disguised as a moderate daily average. This has important implications when the interaction of social drinking habits at weekends is considered.

More than half the men drinking over 120 grammes of ethanol per day, and more than half the women drinking over 800 grammes per day, were suffering from physical, psychological, domestic, social or economic disturbance as a result of their alcohol consumption. This heavy intake would have the result that their blood alcohol concentrations would

often exceed .08gm%.

Krupinski and his colleagues¹³ studied the health of the community in a rural town in Victoria, and took the number of glasses of beer drunk weekly as their index of drinking habits. They found that 10.8% of male adults were non-drinkers, 33.4% drank 5 to 30 glasses a week, and 28.2% drank more than 30 glasses of beer a week. Of the adult females, 38.9% were non-drinkers, 41.7% drank under 5 glasses a week, 17.1% 5 to 30 glasses weekly, and 1.8% 31 or more glasses weekly.

The detected drinking driver

It is clear, therefore, that the vast majority of Australians (and in particular Australian men) do drink, and many of these drinkers often consume a heavy dose of alcohol. Some of these drinkers (we do not yet know with any accuracy what proportion or under what conditions) are involved in traffic crashes. This subgroup has been the subject of special attention in recent years, as has that group of drinkers whose driving behaviour, while it has not resulted in a crash, has been sufficiently noteworthy as to bring them to the notice of enforcement authorities.

In New South Wales in 1970 there were 9557 convictions under current legislation which stipulates a maximum level of blood alcohol of .08gm% and which is supported by the "Breathalyzer" instrument and "Alcotest" screening device. Of all these cases, the blood alcohol level of 14.13% fell within the range .08 to .10gm%, 47.36% in the range .11 to .16gm%, 22.67% from .17 to .20gm%, 12.56% from .21 to .25gm%, 2.83% from .26 to .30gm%, and

0.45% had levels of .30gm% or more.

The "Breathalyser" instrument is used on a similarly large scale in Victoria, and Raymond¹⁷ has reported on the first findings of a study of 20% of the 2380 drivers who were tested in the Melbourne metropolitan area in 1967. In her study sample of 476 drivers, there were only 9 females. 70% of the sample had blood alcohol concentration of .15gm% or more, while 34% had levels of .20gm% or more. Preliminary analysis showed that 98% were males, 78% were driving cars, 72% had been drinking beer only, 70% were blue-collar workers, 68% were apprehended at weekends, 62% had other traffic convictions, 60% were less than 4 miles from home when booked, 50% had been involved in an accident, 37% had a criminal record, and 30% were aged under 25 years. Only 28% had no previous traffic or criminal convictions. Raymond concluded on the basis of these preliminary data that drivers who are interviewed by the breath analysis squad are in many respects not typical of the general driving population, and are not "average blokes" who have been unlucky enough to be caught.

Whitlock and his colleagues in Queensland¹⁹, as part of an attempt to disentangle drinking habits from the incidence of alcoholism and other factors in traffic crash occurrence, investigated the age and drinking habits of road users who had been killed. At the same time they checked on the evidence of alcohol-induced liver damage in these subjects. They examined a total of 120 fatalities during a four-month period of study, comprising 48 pedestrians, 42 drivers, 4 motorcyclists, one

cyclist and 25 passengers in motor vehicles. 26 of 38 drivers who were held by the police to be responsible for their own deaths had blood concentrations greater than .10gm%, with levels in excess of .20gm% being found in 10 of these fatalities. Altogether, 28 of the 37 male drivers held responsible for their deaths had been drinking beforehand, compared with only one of the six men not held responsible. Of the 46 drivers and motorcyclists, 29 showed measurable amounts of alcohol in their bodies. In one subject blood tests could not be carried out, but the urine contained .36gm% of alcohol and the authors presumed that he was heavily intoxicated. In only three instances were the blood alcohol readings less than .10gm%.

These authors classified the drinking habits of their subjects into the following groups: total abstainer, very occasional drinker (less than 12 drinks per year), regular low drinker (about one drink per week), regular moderate drinker (one to two drinks per day), regular heavy drinker (3 or more drinks per day), pathological drinker ("spree" drinker), and chronic alcoholic. They found notably high blood alcohol levels among persons aged less than 29 years who were classed as "moderate regular" drinkers, and generally high blood alcohol levels were also found in "moderate" drinkers. High blood alcohol levels were expected, and found, in the heavy and abnormal drinkers in the older age groups, but this study showed clearly that a sizeable number of younger men who are not regarded as heavy drinkers do from time to time drink excessively. The authors noted that when

this is combined with driving, usually at night, the results can be disastrous. 21 of the 26 drivers with blood alcohol concentrations in excess of .10gm% were involved in accidents at night or in the early hours of the morning. Data summarized by Birrell³ have also drawn attention to the very high blood alcohol levels often found in drivers aged between 20 and 24 years who have been arrested for drunken driving. Whitlock's team conclude from their evidence that it is the drunken driver rather than the driving drinker who appears to be Australia's particular problem, although some driver victims are undoubtedly disturbed or antisocial personalities. The degree to which the excessive drinking so often found in evidence in drink-driving crashes and offences is a symptom of illness is still not clear, but is very important to the successful management of the people concerned.

Attitudes to drinking

Just how society views the excessive use of alcohol by road users, particularly by drivers, is of fundamental importance to the success of measures planned to control such behaviour. It is highly likely that failure to take into account these attitudes, which are in turn a function of a vast variety of social, cultural and economic variables, has had a severely limiting effect on drink/driving countermeasure activities up to the present time.

Some examples can be drawn from differing national approaches. In Europe, there are some fascinating variations in approach to drink/driving law enforcement between neighbouring countries with very similar economic structures, road networks and traffic crash rates; some of these differences have been summarised by Phillips in a recent report.¹⁵ For instance, in Belgium, the law relating to alcohol and road traffic is extremely limited in its terms. Belgians are the highest among European beer consumers, and the brewing industry is a very important one. Seemingly, the economic consequences of prejudicing the brewing industry to any degree at all could be so serious that they would have to be seriously considered before any new policy step could be undertaken. In Belgium, a driver will not be charged with a drinking/driving offence unless a blood test has shown that he has a blood alcohol concentration exceeding .15gm%. If an "Alcotest" screening device indicates that a motorist has a blood alcohol concentration of over .08gm% the police may temporarily immobilise the car by confiscating the key, but the driver would not be prosecuted. Phillips stated that the attitude of both the public and the police authorities was that the law was sufficiently exacting, and alcohol was not considered to be a very important factor in the occurrence of traffic crashes.

Over the border in Holland, where the per capita consumption of beer is moderate, there is an extremely severe attitude to the driver whose capacities are impaired by alcohol. It is not unusual for a man to be imprisoned for a short period

for conviction for a first offence of driving with a blood alcohol concentration of over .08gm%. If he is convicted for a second time, he is likely to suffer considerably heavier penalties. If he is convicted for a third time, the Police Commissioner will cancel his driving licence and will moreover require him to obtain a statement from a psychiatrist that he has been subjected to treatment and that it is a reasonable risk to let him back on the roads. Clearly, the marked contrast which exists in political, public and legal attitudes between Belgium and Holland is a result of very different sociological conditions, and these have had a profound influence upon the policies adopted in each particular community.

Encel and his colleagues in Sydney¹⁰ have attempted to define the Sydney community's normative attitudes towards drinking, because, as they say, these will determine the extent to which certain forms of drinking will be inhibited or encouraged. (Drinking before driving is obviously one such form, although these workers do not specifically categorise it.) Australians are reputed to hold very "permissive" attitudes to alcohol use, thus encouraging widespread drinking, heavy drinking and drunkenness. The evidence is that clearcut normative attitudes do exist, but that in fact the degree of consensus varies considerably with the specific drinking situation. For instance, the study showed considerable consensus with respect to condemnation of drunken husbands, and

clear disapproval of the encouragement of an 18-year-old boy to drink. On the other hand, the drinking of labourers in hotels was clearly acceptable behaviour. There was a relative lack of consensus in attitudes towards housewives and teenagers drinking. Encel suggests that it is an exaggeration to speak of a generally permissive attitude towards drinking in Australia, of which Sydney is probably representative for this purpose. The only drinking situation which elicited general support was working-class pub drinking; every other situation examined showed a high incidence of restrictive attitude. These findings are in accord with both law and custom relating to the serving and drinking of alcohol in Australia. The authors comment that their study is a small illustration of the frequent confusion between drinking, which is a sociological phenomenon, and alcoholism - a public health problem. Constructive discussion of what might be done about alcoholism is frequently vitiated by inadequate analysis of the basic behaviour pattern on which alcoholism depends, that is drinking. Any advance in the study of drinking behaviour requires the addition of further sociological variables to the broad classifications now used. Traffic accidents, like alcoholism, are a public health problem also arising in part from the widespread custom of drinking, and a similarly structured approach is particularly necessary in view of the extraordinary complexity of the traffic crash situation.

Drink-driving practices and attitudes in Sydney

In the latter part of 1971 a survey was undertaken of a random sample of the Sydney population in order to provide answers to a number of important questions. Among these were:

1. To what extent are social pressures operating to minimize the incidence of drinking before driving?
2. To what extent are social pressures operating to encourage drinking before driving?
3. Are people aware of the effect of alcohol on driving ability?
4. Are people aware of the extent to which alcohol is causally concerned in a high proportion of serious traffic crashes?
5. What do people understand about the laws relating to drinking and driving, and what are their responses to such laws?

Interviews were conducted with 1196 male and female respondents distributed at random throughout the Sydney metropolitan area. Ages ranged from 17 to 70 years. The size of the sample was selected so as to ensure an adequate representation of all age groups and road user characteristics for detailed examination and categorization later. Each interview lasted nearly 1½ hours, and was conducted by interviewers with past experience in social surveys of alcohol usage. The number of refusals was low, around 12% of the total sample, and

the resulting sample is considered to be representative of the Sydney population within the stated age ranges.

Full-scale electronic processing of the data is now being undertaken and the results will be reported as soon as possible, but some preliminary data have been extracted manually.

Respondents were not aware at the start of each interview that the questionnaire was specifically oriented towards drinking, but only that their driving habits and attitudes to traffic safety were under examination. They were first asked what they thought were the three most important factors contributing to serious traffic accidents, and then which of these three they considered the major cause. Only 32% of the male respondents and 41% of the females included alcohol as a contributor to serious crashes, and, of these, 40% of the males and 30% of the females considered it to be the major cause.

Respondents were then asked to rank in order of severity nine offences (failure to give way to a vehicle on the right; exceeding the speed limit in a non-built up area by more than 10 m.p.h.; exceeding the prescribed concentration of alcohol by a large amount; failure to indicate when changing lanes; exceeding the speed limit in a built-up area by more than 10 m.p.h.; disobeying a stop sign; exceeding the speed limit in a built-up area by less than 10 m.p.h.; failing to stop at a red light; exceeding the prescribed concentration of alcohol by a small amount). Of the men, 42% ranked "exceeding the prescribed

concentration of alcohol by a large amount" first, and 67% first or second. Of the women, 34% ranked this offence first in severity, and 58% first or second.

The majority of the Sydney population, therefore, views drunken driving as a serious offence when presented with the activity as a choice among others, but comparatively few spontaneously stated that in their opinion alcohol was a serious contributing factor to traffic crashes. There is considerable room for increasing awareness of the problem.

Respondents were asked whether they drank at all and, if so, how often. Of the males 7.5% were abstainers, as were 21.4% of the females. Over nine out of ten of the males of driving age, therefore, had a drink once in a while, and eight out of ten of the females. For both sexes, the commonest frequency was once or twice a week. Over one-third of the men drank nearly every day or more often, whereas only 16% of the women did so. The general frequency of drinking was lower for the women, of whom 78% drank once or twice a week or less, whereas 77% of the men drank once or twice a week or more.

The men generally drank a greater amount on each occasion: 15% stated that they drank five or more glasses on nearly every occasion, but less than 3% of the women drank that quantity.

(When the questions related to numbers of "glasses"; it was explained that a "glass" referred to a 10 oz "middy" of beer, one nip of spirit, or a standard 3 oz measure of wine.) At this stage, it appears that the stated drinking patterns of the

sample correspond closely with those of Encel's Sydney survey and breakdown of habits against age groups and driving characteristics should be illuminating.

It was put to those respondents who were both drinkers and drivers that some people say "you should never drink alcohol before driving", while others say "it doesn't matter very much"; they were then asked how often they had something to drink before driving (not necessarily immediately before). Of this group, 12% of the males said "never", as did 51% of the females. As might be expected, only a tiny proportion of men who drive and who sometimes drink follow the dictum: "if you drink, don't drive". This entreaty is virtually totally disregarded by the group whose behaviour it is intended to change, although about half the women drivers said they would never drink before driving. Furthermore, when asked whether they had ever driven when they felt they had had too much to drink, 50% of the males said yes, they had, but only 11% of the females.

The same respondents were asked what they thought would be the largest quantity they, individually, could (but not necessarily would) drink in a 60-90 minute period and still be safe to drive. Of the males, less than 2% said none at all, and 84% were in the range of 1-6 glasses. Seven to 10 glasses were thought to be safe by 14% of the men, and one optimist believed that over 11 glasses would be safe for him. The females were more conservative: 17% said none at all, 83%

said 1-6 glasses, and only one woman stated 7-8 glasses.

Over half the women believed that 1-2 glasses was their limit.

Overall, it appears that most respondents' assessment of crash risk as against alcohol intake was fairly accurate. It is worth noting that the blood alcohol levels typically found in crash victims represent around 12 drinks taken in the first hour.

All respondents were asked to place somewhere in a list of categories a man who goes out for a drink every week, who quite often drives home when he has had too much to drink, and who on one such night is involved in a serious crash on the way home. Males and females responded in a very similar way. The man in question was viewed as "irresponsible" by 42% of the males and 44% of the females, as a "criminal" or "potential murderer" by 27% of the males and 32% of the females, and as "unlucky" or "stupid" by 29% of the males and 22% of the females. In general, these do not appear to be notably "permissive" attitudes.

When the same respondents were asked whether his behaviour indicated that he might have a drinking problem, 51% of the males and 57% of the females agreed with the proposition. This is a high proportion, but the answers to the preceding question indicate that the problem drinker does not elicit much sympathy if he crashes while driving.

Those who both drank and held a driver's licence were asked how they usually returned from wherever they had been drinking (other than in their own homes, naturally), and, if the

answer was a motor vehicle, whether they usually drove. Males were far more accustomed to doing so than females: about 80% normally drove themselves from a licensed club, restaurant, party, or recreational outing, and 60% usually drove home from a hotel/pub. Less than a quarter of the women usually drove back from a hotel or club, and around half from a restaurant, party or recreational activity involving drinking. These findings simply support the proposition that driving a car is currently a necessary prerequisite to social activities including drinking outside the home.

Respondents were reminded that a new law on drinking and driving had come into force in New South Wales in December 1968 (which, among other provisions, made it an offence to drive with a blood alcohol concentration of over 0.08gm%), and were asked whether they could say what the legal limit was. Many had no idea: 29% of the males and 62% of the females. However, 44% of the men and 20% of the women correctly stated 0.08gm%, 15% of the men and 10% of the women estimated a lower level, and only 3% of the men and the women estimated higher. Quite a few respondents (9% of the men and 5% of the women) estimated the level in terms of middies of beer, with a comparable level of accuracy. Ignorance of legal controls can prevent their operating as a deterrent, and there has so far been little attempt to educate the public on the relationship between the amount of alcohol consumed and the legal limit. People cannot exercise individual responsibility in obeying the law, or resist social pressures imposed by others, if they are ignorant of the behaviour it proscribes.

Ignorance of the scientific basis for the legal limit might also promote resistance to legislation based on blood alcohol levels. Respondents were asked to say which of the following two statements was nearest to their beliefs: "a driver with a blood alcohol concentration of 0.08gm% (legal limit) is about twice as likely to cause an accident as when he is sober"; and, "some drivers are just as safe with a blood alcohol concentration of 0.08% as when they are sober". The men were split equally between one alternative and the other, but 60% of the women chose the first, "correct" statement.

Respondents were asked whether the introduction of the drink-driving legislation involving the use of the "Breathalyser" instrument had changed their personal drinking habits. It was stated not to have done so in the case of 62% of the licence-holding males who drank, and 96% of the females. For both sexes, the reasons for this were sought in more detail. 84% of the men who had not changed their habits, and all the women, believed that their customary behaviour was within the bounds of the law anyway: they never drank over the limit, they had never driven after drinking, and so on. Among the remaining 16% of the men who had not changed their drinking-driving habits, there were only a very small number who had continued to drive while accepting risks (of being caught or crashing) which they perceived as being too small to worry about.

Of those respondents who both drank and drove, 18% of the men and 4% of the women said that the introduction of the Breathalyser had changed their habits, either in cutting down on the amount of alcohol consumed before driving or in forcing

modification of their transport arrangements. The remainder of the sample gave a qualified response, saying that their behaviour was changed at first but that this was only a temporary effect of the new law.

Some interesting comparisons can be made with a survey conducted in Britain by the Road Research Laboratory, who were asked to assess the effect of the drinking/driving law which came into force in October 1967, and also the effect of the associated large scale publicity campaign. It was found that after the new law had come into force, drivers drank away from home as often as they did before, but were less likely to drive back after drinking. Among drivers, there was found to be an increase in knowledge about the new law and what it meant for them; few disapproved of the powers given to the police. However, it was found that most drivers thought they knew how much drink it is safe to take before they reached the limit, and the extent to which they were tolerant of drinking and driving seemed not to have changed since before the campaign. It was concluded that drivers' behaviour was affected favourably by the new law and the publicity campaign, but that attitudes to drink and driving had hardly changed at all. No forecast was given as to how behaviour in respect of drinking and driving might change with time, although the evidence of increased knowledge of the law from the survey suggested that the extent to which the law was enforced was likely to be important. It was apparent that the law and the attendant campaign did not seem to have lowered drivers' estimate of the

maximum amount of alcohol they could take without its affecting their driving. It seemed likely that the new law did bring about a behaviour change, but that the educational campaign was of value only in the sense that it made drivers aware of the new law.

All in all, the imposition of legislative controls on the drinking driver in Britain and Australia has not had as much effect on behaviour, attitudes and crash rates as might have been hoped, and it is the aim of sociological research such as that being presently undertaken to remedy this situation if possible.

Conclusions

To mix the customs of alcohol intake and road use leads to great increases in traffic crash risk, and it is therefore necessary to control in some way the behaviour of those drivers who drink heavily before taking the wheel. (The drunken pedestrian, too, is a traffic safety problem of considerable importance, but the behavioural control of pedestrians raises special problems beyond the scope of this paper.) Chosen control measures are in this respect imposed on an area of behaviour strongly influenced by social custom. A complex network of social attitudes governs how, when and where people drink, and the degree to which the law conflicts with these drinking norms will be an important factor in its success or otherwise as a deterrent. Social pressures can assist in

influencing behaviour; ideally, social sanctions should reinforce the deterrent effects of legal sanctions. But social pressures acting to curb drinking and driving are weak; heavy drinking and drunkenness are accepted and even encouraged in some sections of the community, and ignorance of the importance of alcohol in severe traffic crashes will be inclined to perpetuate acceptance of and tolerance for driving under its influence. On the other hand, there are strong social pressures encouraging drinking before driving; the need to conform to group norms is a powerful motivating force, especially among young men, and where the law and social norms are in conflict the threat of social sanctions will probably outweigh the threat of legal sanctions for many individuals. Support or otherwise for these hypotheses will be sought in further analysis of the data collected for the present study.

A great deal of this discussion has been necessarily conjectural. Research in the social sciences is urgently required in order to prepare an academic foundation for the planning of countermeasures based on behavioural control, because important differences in customs and attitudes relating to both driving and drinking, as well as the combination of the two activities cannot be disregarded. Alcohol when ingested before driving, does not of necessity "cause" a traffic crash any more than it necessarily "causes" alcoholism or moral decay (as was once generally postulated), because crashes occur

as the eventual end-point of a most complex causal chain. These destructive events can be prevented, or their effects ameliorated, by attention to the chain at a great many different places, and modifications to the traffic system to make it safer should therefore not be confined to attempts to control behaviour, however reprehensible such behaviour may be. Rational improvements to the environment and to vehicles will reduce the losses arising not only from sober driving, but from drunken driving too.

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